A hidden coral destruction

A newly revealed ancient and little-studied biological community is under unprecedented threat, writes **Nigel Williams**.

Pressure is growing for protection of some of the least known but most ancient biological systems — deep-water coral reefs — under threat of destruction as trawlers increasingly turn to deep sea fishing with catches in more conventional shallow-water fisheries dwindling dramatically.

Deep water corals, as opposed to the well-known shallow water corals of the tropics, occur worldwide and in high latitudes. Although known to fishermen and scientists for centuries they have been poorly studied and the number of reefs unknown.

But in the north-east Atlantic, where fishing vessels have been driven off the continental shelf to deeper waters in the search for fish, large amounts of coral 'bycatch' have been appearing in the trawlers' nets. And over the past five years video material from manned and unmanned submersibles has begun to reveal evidence to a wider audience of just how spectacular and extensive these reefs can be, stretching from Ireland to Norway. The new technology has been largely driven by oil companies seeking new fields worthy of commercial exploitation.

But the pictures also reveal the extent of damage to the reefs caused by trawling. Trawl scars at depths from 200–1,400 metres and up to 4 kilometres long have been observed, where coral has been destroyed, rocks have dragged around and sediment turned over.

Where reefs are known to occur, fishermen try to avoid them as they can cause considerable damage to their trawling gear, but with pressure building to find new fishing grounds, fresh damage is inevitably occurring.

The new evidence of destruction is more alarming in the light of work carried out by Jason Hall-Spencer at the University of Glasgow, and colleagues in France and Norway published in a recent issue of the Proceedings of the Royal Society (*Proc R. Soc. Lond. B* 2002, vol. 269, pages 507–511). They have charted some of the damage but they also carried out carbon dating to analyse the age of the reef corals. Analysis of living material suggested an age of around 450 years and from dead reef material, between 4,000 and 5,000 years.

"I believe some material may perhaps date to around 10,000 years," says Hall-Spencer. Linear skeletal extension rates for one species of coral are estimated to range from 2–25 mm per year, slowing down with age, such that accumulation is extremely slow.

Video evidence examined by Hall-Spencer and his colleagues found that the deep-water coral systems off west Norway were especially fragile and easily reduced to rubble by towed fishing gear. Unlike shallow reef systems which favour forms capable of withstanding constant wave action, there is also insufficient light for calcareous algae to attach and strengthen the reef structure.

The team found five main coral species in total but data on their biology is scant. Their sexual behaviour is unknown and even data on feeding and other behaviours is scarce, the team report. And some of the reef-associated fish now targeted by fishermen are very long-lived. Some do not reach maturity until 30 years old and can have a lifespan of more than 100 years which also has major implications for any efforts to develop a sustainable fishery amongst these deep-living species.

But with growing pressure from fishing on these deep-sea communities, the corals' future looks threatened. Fortunately, both Australia, concerned about destruction of reefs off Tasmania, and Norway have now introduced legislation to protect the reefs. Hall-Spencer and his colleagues hope that growing awareness of these reefs will prompt other states to follow their lead.